CERTIFICATE OF TRANSLATION

As a below named translator, I hereby declare that my residence and citizenship are as stated below next to my name and I hereby certify that I am conversant with both the English and Korean languages and the document enclosed herewith is a true English translation of the Invention Disclosure with respect to the Korean patent application No. **1999-45159** filed on **October 18, 1999.**

NAME OF THE TRANSLATOR : Seo-Il Yoo

SIGNATURE : _____

Date   :   August 10, 2004

RESIDENCE : MIHWA BLDG., 110-2, MYONGRYUN-DONG 4-GA,
                    CHONGRO-GU, SEOUL 110-524, KOREA

CITIZENSHIP : REPUBLIC OF KOREA

METHOD OF PAGING ALERT GENERATION USING PAGING GROUP INDICATING PAGING ALERT TYPE

1. BACKGROUND OF THE INVENTION

5

a. Field of the Invention

The present invention relates to a technology, which uses one specific group from among paging groups as a beacon paging in WCDMA/UMTS, a 3rd Generation communication scheme, thereby limiting paging alert according to

10 existence or absence of paging of the specific paging group.

b. prior art drawings

FIG. 1   Entire structure of paging system.

Terminal A examines this group.

15   FIG. 2   Paging Group

288th paging group

physical channel structure on 0.625 slot unit basis

FIG. 3   Relation between paging group and physical channel

20   ### c. Description of the prior Art(s) and problems thereof

It is impossible to limit paging alert in a specific area by the current paging structure.   As shown in FIGs. 1 and 2, when a UMTS terminal is designed according to the current paging scheme, a base station or node B cannot prevent the terminal from generating a paging alert sound within a specific area.

25   A 720 ms super frame includes 288 paging groups in total, and each UE belongs to one of the 288 paging groups and examines only its own paging group.

FIG. 3 shows the way in which a PCH is connected to the physical channel.   PI is a paging indicator bit including PI1 and PI2 and is not channel encoded.   Therefore, L1 examines a logic of the PI bit, thereby determining

30 whether there exists a paging or not.   Through the examination of the PI, when

it is concluded that a paging exists, MUIs (mobile user IDs) are decoded. Each slot has a length of 0.625 ms and includes a pilot and data. Each paging group includes four slots, which can be reclassified into six sub items (i.e., PI1, PI1, MUI1, MUI2, MUI3, and MUI4). Each set of the six sub items are distributed

5 within every four slots. Therefore, paging 288 starts from the 1149th slot (287*4 +1).

When a UE is turned on, the UE calculates its own paging group by means of ID (IMSI or its equivalent) of the UE. When the UE has come into an idle mode, RF RX power in the corresponding paging group is turned on and

10 whether a paging exists or not is examined. Here, if the PI bit reporting existence or absence of a paging has been set as 1, a paging message is analyzed. When the paging message contains the ID of the UE, page match occurs and the UE generates an alert.

In alerting, the UE generates an alarming sound set in advance by a user.

15 However, there is no way to prevent the UE from generating an alarming sound, even in public places, such as a music hall, a conference room, etc.

d. object of the invention

Accordingly, the present invention has been made to solve the above-

20 mentioned problems occurring in the prior art, and an object of the present invention is to prevent a UE from generating an alarming sound, even in public places, such as a music hall, a conference room, etc., and disturbing people in the public places. A sub-cell is set on a place within one cell, in which it is necessary to prohibit generation of alarming sound, and all UEs located within

25 the sub-cell are forced to be in a mode in which the paging alert automatically comes into a vibration mode or its equivalent mode (without ringing of any bell sound). As a result, existence of paging can be reported to the user while other people are prevented from being disturbed by sound for the paging alert.

30 2. DRAWINGS OF THE INVENTION

FIG. 4   cell structure for paging alert limitation

A group corresponding to UE A is examined.

Beacon paging group.

5   TX only in sub-cell

FIG. 5   beacon paging structure

Generate BCH of node B

Sub-cell exists?

10   Yes

Set paging group for sub-cell

Insert beacon paging group information in BCH message

Transmit

No

15   Generate BCH message

Transmit message to UE

FIG. 6   process of generating BCH message of node B

Generate PCH of node B

20   CN generate paging request

Sub-cell exists?

When existent

Appoint paging group excepting beacon paging group

Generate paging message

25   Transmit paging message to corresponding paging group & no TX by

beacon paging group

When absent

Appoint general paging group

FIG. 7   process of generating PCH message of node B

30

3

Sub-cell PCH generation

Beacon paging group

At corresponding position

No TX

5   At non-corresponding position

Set both PI & MUI as 1 & transmit them

End

FIG. 8   generation of PCH in sub-cell

10   UE receive paging

Sub-cell exists?

Yes

Calculate paging group excepting beacon paging group

Beacon paging group?

15   Yes

Examine PI or MUI

When PI is 1

Paging alert mode shift (vibration)

When PI is not 1

20   User setting is necessary for paging alert mode shift

Beacon paging group?

No

Corresponding paging group?

25   Yes   (No)

Examine PI bit

When PI is 1   (when PI is 0)

Analyze paging message

UE ID found   (UE ID not found)

30   Process paging match & generate set alert

Sub-cell exists?

No

Individual

5   FIG. 9   flowchart for operation of UE

3. DETAILED DESCRIPTION OF THE INVENTION

10   <u>a. construction of the invention</u>

Cell construction is made as shown in FIG. 4, in which a sub-cell overlaps on a specific cell. That is, two BTSs are necessary. This sub-cell is connected to an RNC (radio network controller). Further, the sub-cell has only PCH and is designed in such a way that the PCH can reach a UE within a specific

15 area. Timing of the two cells is exactly synchronized through wire or wireless connection between the two cells.

Therefore, all UEs in cell A use all channels in the cell and use PCH only in an idle mode for examination of PCH.

BTS of cell A operates PCH except for a portion corresponding to

20 beacon paging group, and sub-cell A transmits beacon paging group always with logic of 1. Here, PI and MUI included in the structure shown in FIG. 3 are data inserted by layer 1 without channel coding.

As shown in FIG. 5, the beacon paging group may be set to have 288 periods (720 ms), and may be set to have 288*N periods (wherein N is an

25 integer). Here, the UE can find the location of the beacon paging by counting the super frame (720 ms) of PCH. Therefore, it is unnecessary for the UE to examine beacon paging in every super frame, and thus consumption of power by the UE can be reduced.

The operation of the two cells have influence on each other only in PCH

30 transmission state. However, the PCH physical channel has the same

construction as that when only cell A exists. Referring to FIGs. 3 and 5, a slot corresponding to the beacon paging group is additionally inserted in sub-cell A.

The beacon paging group may be freely selected by node B. In the present invention, paging group 288 is selected as an example of the beacon paging group.

b. operation of the invention

When a cell contains a sub-cell limiting paging alert, the existence of such a sub-cell must be reported through BCH. For this, the BCH message must include a field capable of representing the beacon paging group and its period. The BCH message made in this way is transmitted to all UEs within the cell (see FIG. 6). In this way, the beacon paging group is examined only when there exists a sub-cell. When no sub-cell is contained, only the paging group of the UE's own is examined.

When there is a paging request from CN (core network), RNC generates a paging message by means of the requested information. Further, RNC calculates the paging group by means of ID of the UE. Here, when there exists a sub-cell, RNC creates paging groups except for the corresponding paging group. Further, cell A does not TX a slot corresponding to the beacon paging group (in the case of the sub-cell shown in FIG. 7, layer 1 inserts and transmits PI and MUI with logic 1. When it is not the beacon paging group, TX is not performed, so that there is no influence on the PCH of the cell.

The UE determines an existence of a sub-cell through BCH of the cell. When there exists a sub-cell, a corresponding beacon paging group and its own general paging group are always examined. In beacon paging group, PI or MUI bit is examined through examination of the number of logic 1 (soft-decision) by layer 1, so that whether the UE is within a sub-cell or not is investigated. As a result of the investigation, when the UE is considered to be within a sub-cell, the alert mode of the UE is automatically changed into a mode generating no sound, such as a vibration mode, and this change is displayed on an LCD. In contrast,

when the UE is not considered to be within a sub-cell, the alert mode set by the user is maintained.

Further, when a page match occurs in the paging group of the UE's own, the UE performs corresponding processing and generates reception call signaling according to an alert type set in advance.

c. effect of the invention

A UE is prevented from generating an alarming sound, in public places, such as a music hall, a conference room, etc., and disturbing people in the public places. The existence or absence of a sub-cell is reported to BCH, so that the beacon paging group is examined only when there exists the sub-cell. Therefore, the UE performs the same operation in a cell containing no sub-cell as that of the conventional way. Further, even when the cell contains a sub-cell, the paging group of PCH can be used to prevent the UE from alerting. Therefore, the entire system does not become complicated.

4. CLAIMS

1. A radio communication system using a specific paging group for limiting paging alert of a UE.

2. A radio communication system having a sub-cell BTS generating a specific paging group.

3. A radio communication system characterized in that existence or absence of a sub-cell is reported to UEs within a cell.

4. A radio communication system as claimed in claim 3, wherein a BCH message includes fields capable of representing location and period of a beacon paging.

5. A radio communication system characterized in that a BTS of a basic cell does not TX in the beacon paging group when there exists a sub-cell.

6. A radio communication system characterized in that a BTS of a sub-cell does not modulate PI and MUI, which are instead transmitted with logic 1 by layer 1.

7. A UE which examines a paging group and a beacon paging group of its own when there exists a sub-cell.

8. A UE which converts a reception call signaling method of the UE into a no-sound mode such as a vibration mode when there exists a beacon paging.

1. BCH periodically transmits system information to all UEs within the cell.
The system information includes:
1) ID of NW currently being used, location area ID, registration ID of URTRAN, and cell ID;
2) all information to be used in measurement of a substitute cell for handover and cell selection;
3) information on control channel within current cell;
4) information for controlling use of RACH; and
5) information defining different specifications supported within the cell,
    - sub-cell information (beacon paging group ID): added matter
    -beacon paging period: added matter; and
6) protocol information.

2. algorithm for calculating paging group

ID of the UE is mapped to a given paging group.   Herein, all UEs are uniformly distributed to paging groups.

3. structure of cell and sub-cell

5

4. structure of UE